

**Shorebird, Seabird and Waterbird Inventory  
of  
Pu'uhonua O Hōnaunau  
National Historical Park**

**Sept. 2003-May 2004**



**Prepared for Ducks Unlimited Inc.**

**By**

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**and**

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## **ABSTRACT**

The objective of this inventory was to document avian species diversity and relative abundance along prescribed shoreline and wetland route within Pu`uhonua O Hōnaunau National Historical Park (PUHO). The study site of PUHO was divided into five study areas: Ki`ilae, South Coves, Picnic/Administration, Imperial Grounds, and Inner Ponds. Three species of shorebirds were observed during the surveys: Ruddy Turnstone (*Arenaria interpres*), Wandering Tattler (*Heteroscelus incanus*) and Pacific Golden-Plover (*Pluvialis fulva*), and one waterbird, the Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*). The Wandering Tattler was the most commonly observed shoreline bird. One pair of Black-crowned Night-Herons was first observed in March 2004.

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## INTRODUCTION

Pu`uhonua O Hōnaunau National Historic Park (PUHO) is a cultural preserve consisting of 73.65 hectares along the coast in the south Kona district on the island of Hawai`i (Figure 1). The park is in the process of acquiring an additional 96.32 hectares of land to the south of the existing park boundaries in an area known as Ki`ilae (Figure 2). Like PUHO, Ki`ilae consists mostly of non-native shrubland and rocky shoreline. Though not officially part of PUHO at the time of this study, the Ki`ilae shoreline was included in these surveys. The majority of the Ki`ilae acquisition lies inland with approximately 0.45 kilometers of shoreline, compared to nearly 2.55 kilometers of shoreline within PUHO. The following report documents the results from the avian surveys conducted at PUHO from September 2003 to May 2004.

## METHODS

The southern boundary in Ki`ilae was the starting point for the walk through surveys (UTM 194743N 2148407E). Surveys followed a prescribed route along the shoreline heading north through the park and terminating at the fish ponds located within the Imperial Grounds (UTM 194140N 2149936E) (Figure 2). The route was approximately 3.0 kilometers long.

The purpose of this survey was to document indigenous shorebirds, water birds, seabirds and seasonal migrants including raptors found at PUHO. All other avian species observed along the prescribed route were documented as well. An existing checklist for the park was referred to, and checked off for all other species. No subsequent information was recorded for species other than shorebirds, water birds, seabirds and seasonal migrants. The checklist is from inventories conducted at PUHO in 1992 and 1993 (Morin, 1996)(Table 1).

Surveys were conducted on the first and third Monday of each month with the exception of 1 March 2003. The park was closed due to storm damage. A make up survey was conducted on 7 March. The surveys conducted on the first Monday were started at sunrise and the third Monday surveys began mid-morning. The alternating start times allowed for a concurrent inventory at Pu`ukoholā Heiau National Historic Site (Figure 1) to have both a sunrise and mid-morning survey start times.

Four study areas were set up within the park: (South Coves, Picnic/Administration, Imperial Grounds and Inner Ponds) (Figure 2). Ki`ilae was treated separately as a fifth study area.

Observations were made with Zeiss 10 x 40 Victory binoculars, and a Canon D30 digital camera using a 100-400 image stabilized zoom lens. Wind and temperature data was collected using a Kestrel 3000 pocket weather station (Table 2).

## RESULTS AND DISCUSSION

Three species of shorebirds were observed during the surveys: Ruddy Turnstone (*Arenaria interpres*), Wandering Tattler (*Heteroscelus incanous*), and Pacific Golden-Plover (*Pluvialis fulva*). The Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*) was the only waterbird reported during this study period.

The most numerous and most frequently observed shorebird was the Wandering Tattler with an average of 3.65 individuals observed per survey and at least one individual was observed on all but one of the 17 surveys (94.1%)(Table 2). The highest single count for a survey (all five study areas) was eight Wandering Tattlers on 1 December 2003.

During the 1992 and 1993 inventories, neither the Pacific Golden-Plover nor the Black-crowned Night-Heron were observed during the formal counts; however, both species were observed during this study with the Pacific Golden-Plover being the second most numerous and frequently observed species of the four shorebird species observed. There was an average of 2.24 Pacific Golden-Plovers observed per survey and the species was observed 82.35% of the surveys.

A pair of Black-crowned Night-Herons nested in a coconut tree (*Cocos nucifera*) in the Inner Pond area (Figure 2). The nest was observed during the March 15<sup>th</sup> survey, although it is suspected that nesting actually began mid to late February. The nest was located approximately five meters above the ground. Park staff saw two hatchlings in the nest; however, only one hatchling was observed during the surveys (Figure 2) (Exhibit 1). Park staff also indicated that the same tree has been used by Black-crowned Night-Herons for nesting for the past five years. The hatchling did fledge and was observed in the Inner Pond area for the remainder of the surveys with the exception of the last survey conducted on 17 May 2004.

Of the five study areas, the picnic/administration area accounted for the highest usage by shorebirds. This was expected since the picnic/administration area contains the majority of rocky tidal pools that shorebirds utilize for foraging.

There were no seabird observations made during any of the 17 surveys. The checklist from the 1992 and 1993 inventories (Table 1), documented 10 species other than seabirds, shorebirds or waterbirds. All 10 species from the 1992 and 1993 checklist were again observed during these surveys. Two additional species observed were a racing pigeon or Rock Dove (*Columba livia*), with colored leg bands, in the South Coves area (Figure 2) (Exhibit 2) and Grey Francolin (*Francolinus pondicerianus*) in the Ki'ilae and South Coves areas (Figure 2). After contacting a local racing pigeon club, the only information gathered from the band color data was that the pigeon was fledged in 2003. Any additional information would have required capturing the pigeon and reading the bands.

## RECOMMENDATIONS

Monitoring procedures to allow park staff to document the observations of any rare, unusual, and perhaps previously undocumented species should be developed and implemented.

Bi-annual avian surveys could be coordinated to coincide with the state Division of Forestry and Wildlife summer and winter waterbird surveys. These counts are usually conducted on the third Wednesday of January and August. Both Aimakapa Pond and Kaloko Pond of Kaloko-Honokōhau National Historical Park are already included in bi-annual surveys of the Kona coast. Kaloko-Honokōhau National Historical Park is one of the three national historic parks or sites administered by the National Park Service in west

Hawai'i (Figure 1). For the sake of consistency, the surveys should use the same methods and follow the same shoreline route that was established for this inventory.

If possible, qualified staff or individuals should conduct additional surveys with special emphasis given between the months of September and May to observe and document any unusual migratory birds and to document, as in this past spring, any nesting activities of waterbirds and shorebirds within the park.

Additional surveys would also provide an opportunity to monitor the park for invasive bird species such as the Red-vented Bulbul (*Pyconotus cafer*) and the Red-whiskered Bulbul (*Pyconotus jocosus*). Any unusual or invasive species should be reported to the state DOFAW and the United States Fish and Wildlife Service.

Since it has been well documented that feral cats (*Felis catus*) pose threat to all bird species, there is a need to develop and implement a program to educate park visitors as well as staff about the importance of not feeding any animals within the park. Efforts to notify the public of the consequences to the native flora, fauna and cultural preservation efforts if they choose to engage in such activities will hopefully lead to a more responsible use of the park. Part of the education efforts should focus on responsibly containing and removing any garbage from the park or utilizing park maintained garbage containers. All garbage containers should be of a design and maintained as not to create an attractive food source for animals. Feral cats were frequently observed in both Ki'īlae and the picnic/administration areas and Mongooses (*Herpestes auropunctatus*) were observed in Ki'īlae, picnic/administration, and Inner Pond areas. Although not observed during the surveys, undoubtedly mice and rats are attracted to the food sources provided by garbage.

## ACKNOWLEDGMENTS

I would like to thank:

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The staff of Pu`uhonua O Hōnaunau National Historical Park

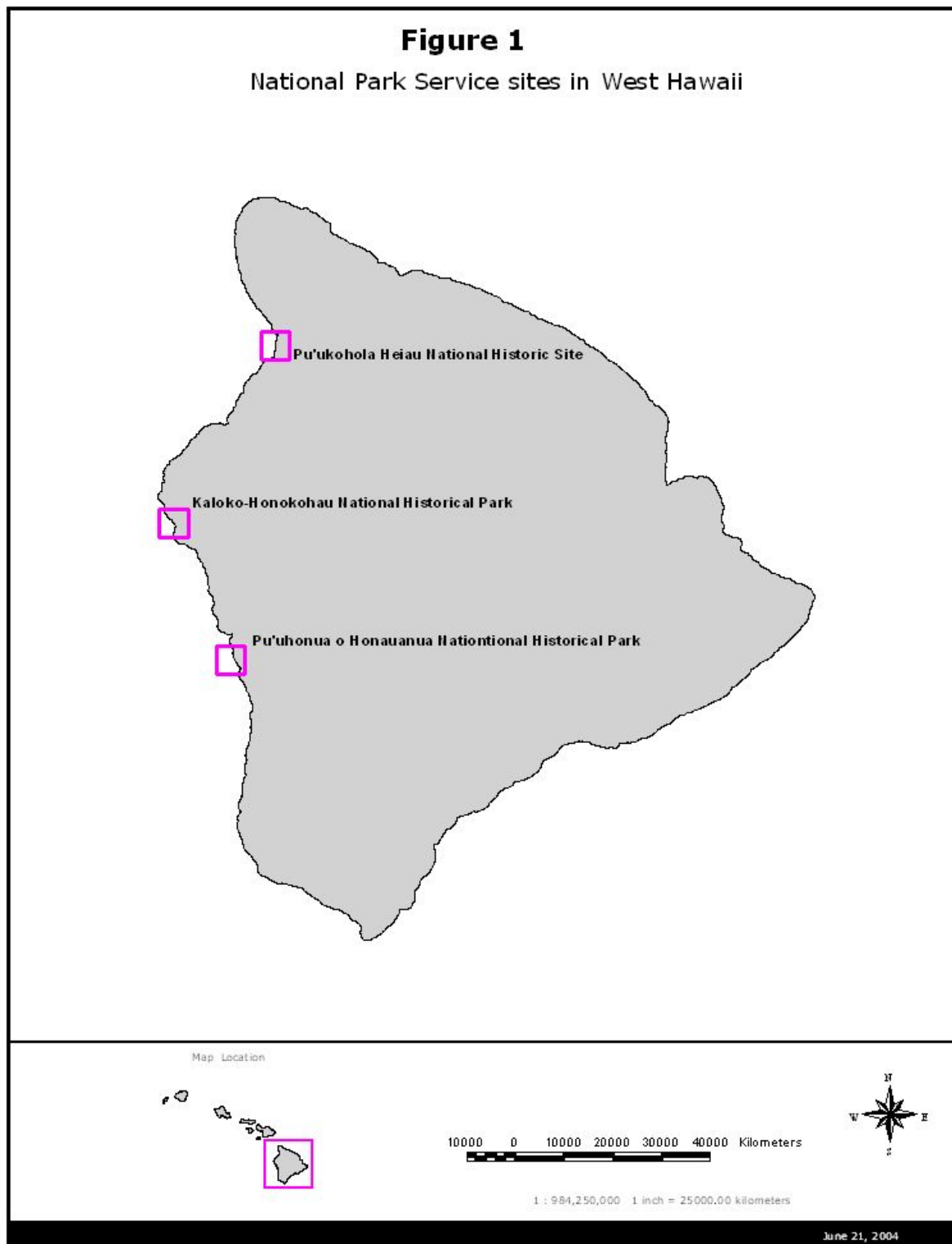
A special thanks to Malia Laber of Pu`uhonua O Hōnaunau National Historical Park, for her help and expertise generating the figures for this report.

## REFERENCES

- Pratt, H.D., Bruner, P.L., and Berrett, D.G. 1987. The Birds of Hawaii and the Tropical Pacific. Princeton University Press, Princeton, New Jersey. 409 pp.
- Morin M.P. 1996. Birds of Pu`uhonua O Hōnaunau National Historical Park. University of Hawaii Cooperative National Park Resource Studies Unit. Technical Report 106. Botany Department University of Hawaii Manoa, Honolulu, Hawaii 96822.
- Pratt, L.W. and Abbott L.L. 1996. Vascular plants of Pu`uhonua O Hōnaunau National Historical Park. University of Hawaii Cooperative National Park Resource Studies Unit. Technical Report 105. Botany Department University of Hawaii Manoa, Honolulu, Hawaii 96822.
- Tomich P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, Hawaii. 238 pp.

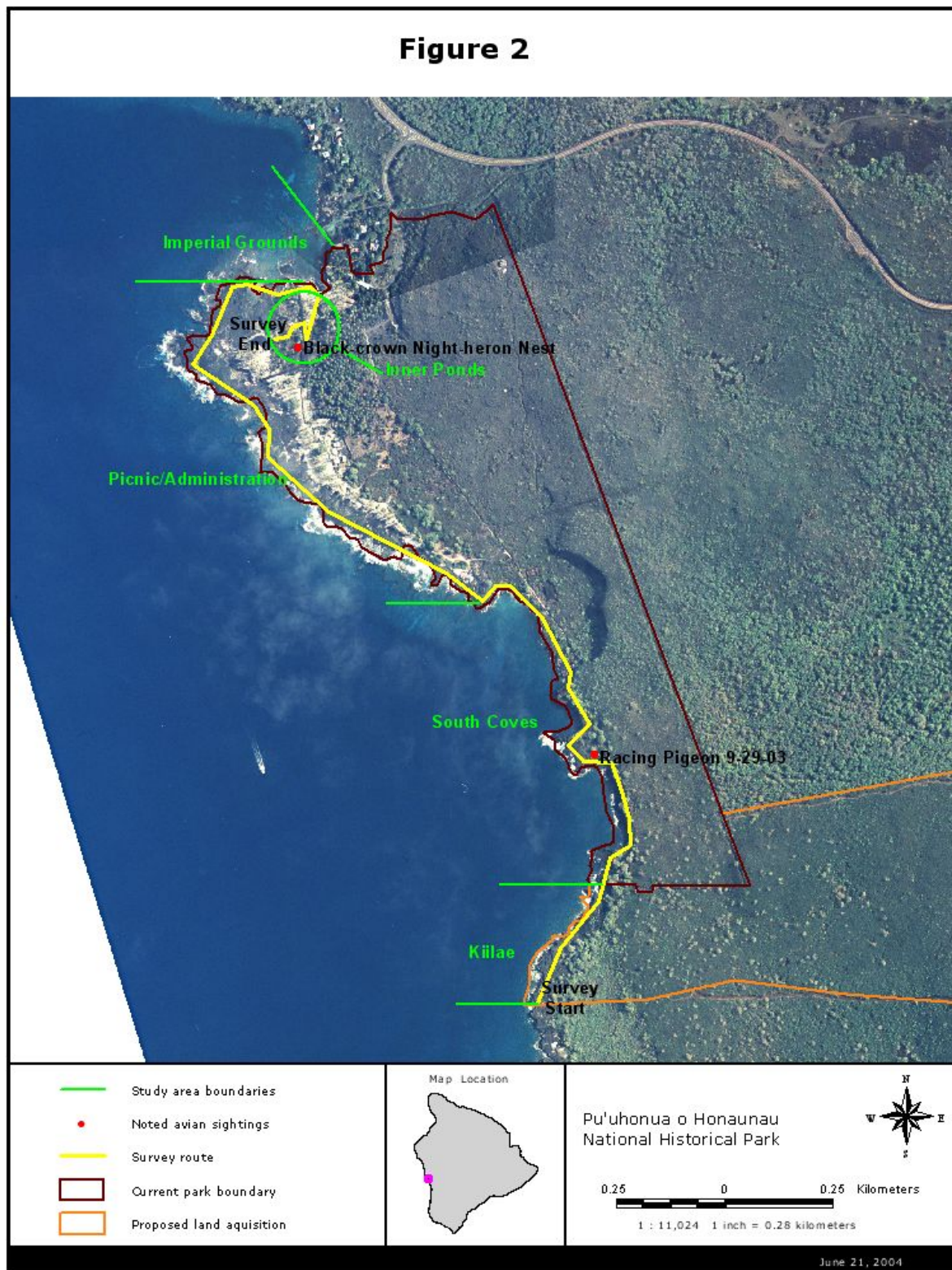


**Map of three National historic parks and sites in west Hawai'i  
administered by the National Park Service**



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**Map of Pu'uhonua O Hōnaunau National Historical Park study areas,  
study route, bird sightings, nest site, and Ki'īlae acquisition**



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## **Figure 2**

### **UTM Coordinates**

The following UTM coordinates are derived from the heads up digitized study route and study boundaries of Figure 2. The aerial photograph used in Figure 2, is from a June 2000 National Oceanic and Atmosphere Administration (NOAA) study. Based upon a GPS coordinate taken with a Trimble ProXR, National Park Service staff estimate the accuracy of the aerial photograph used in Figure 2 at +/- 10 meters.

Study Route start: 194743N 2148407E  
Study Route end: 194140N 2149936E

#### Study Areas:

Ki'ilae: 194743N 2148407E  
194891N 2148677E

South Coves: 194891N 2148677E  
194610N 2149326E

Picnic/Administration: 194610N 2149326E  
194204N 2150143E

Imperial Grounds: 194204N 2150143E  
194205N 2150143E

Inner Ponds Polygon: 194205N 2149959E  
(82-meter radius from UTM)



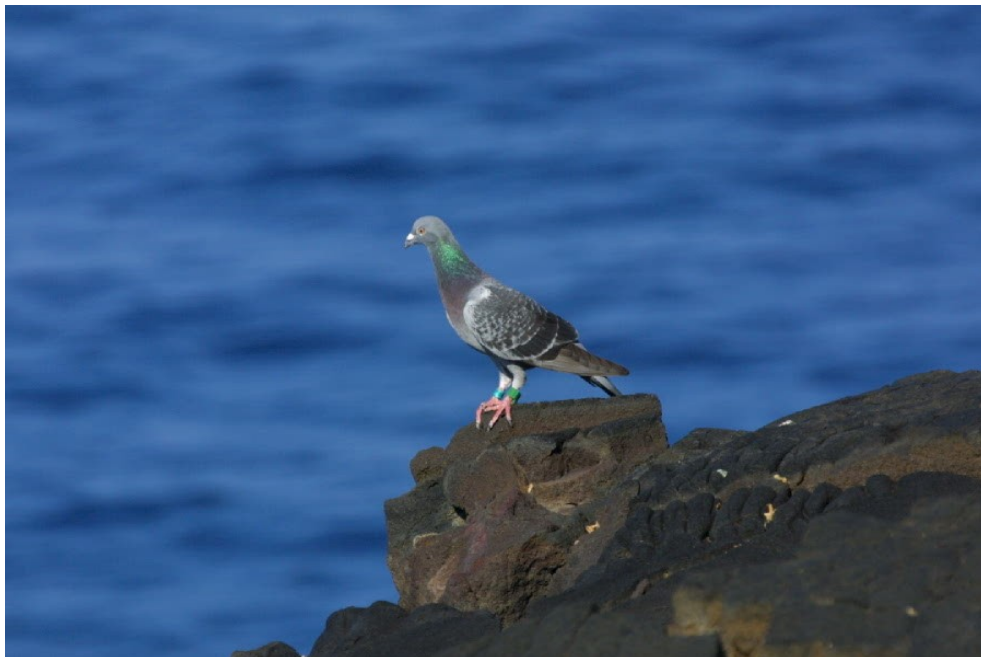
### **EXHIBIT 1**

Photo of juvenile Black-crowned Night-Heron in nest tree at Inner Pond study area



### **EXHIBIT 2**

Photo of banded racing pigeon in South Coves study area



**TABLE 1**

Bird Checklist of Pu`uhonua O Honaunau National Historical Park

	Morin 1992,1993	Waddington 2003,2004
Japanese White-eye ( <i>Zosterops japonicus</i> )	X	X
Common Myna ( <i>Acridotheres tristis</i> )	X	X
Zebra Dove ( <i>Geopelia striata</i> )	X	X
Spotted Dove ( <i>Streptopelia chinensis</i> )	X	X
Northern Cardinal ( <i>Cardinalis cardinalis</i> )	X	X
Yellow-billed Cardinal ( <i>Paroaria capitata</i> )	X	X
House Finch ( <i>Carpodacus mexicanus</i> )	X	X
Saffron Finch ( <i>Sicalis flaveola</i> )	X	X
Lavender Waxbill ( <i>Estrilda caerulescens</i> )	X	X
Yellow-fronted Canary ( <i>Serinus mozambicus</i> )	X	X
Ruddy Turnstone ( <i>Arenaria interpres</i> )	X	X
Wandering Tattler ( <i>Heteroscelus incanus</i> )	X	X
Pacific Golden-Plover ( <i>Pluvialis fulva</i> )		X
Black-crowned Night-Heron ( <i>Nycticorax nycticorax hoactli</i> )		X
Grey Francolin ( <i>Francolinus pondicerianus</i> )		X
Rock Dove/ Racing pigeon ( <i>Columba livia</i> )		X

**TABLE 2 Survey data sheets**

<b>PUHO</b>					
<b>Date:</b>	9/29/03				
<b>Start Time:</b>	8:00 AM				
<b>End Time:</b>	9:40 AM				
<b>Temperature:</b>	26.7c				
<b>Cloud Cover:</b>	0%				
<b>Wind:</b>	1				
<b>Tide:</b>	2.0 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
<b>Ki'ilae</b>			2		
<b>South Coves</b>					
<b>Admin/Picnic</b>				3	
<b>Royal Grounds</b>		5		1	
<b>Inner Ponds</b>					
<b>Total</b>	0	5	2	4	0

**Notes:**

Banded Pigeon Green left/Aqua right  
observed at south coves. Pictures/GPS taken.  
5 cats, 1 Mongoose observed behind admin.

<b>PUHO</b>					
<b>Date:</b>	10/6/03				
<b>Start Time:</b>	6:30 AM				
<b>End Time:</b>	7:40 AM				
<b>Temperature:</b>	24.6c				
<b>Cloud Cover:</b>	30%				
<b>Wind:</b>	1				
<b>Tide:</b>	0.4 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
<b>Ki'ilae</b>			1		
<b>South Coves</b>					
<b>Admin/Picnic</b>				4	
<b>Royal Grounds</b>					
<b>Inner Ponds</b>					
<b>Total</b>	0	0	1	4	0

**Notes:**

2 goats observed at Ki'ilae.  
4 cats and 2 Mongoose observed at admin.  
1 Grey Francolin observed in Ki'ilae.

<b>PUHO</b>					
<b>Date:</b>	10/20/03				
<b>Start Time:</b>	10:30 AM				
<b>End Time:</b>	11:40 AM				
<b>Temperature:</b>	26.9				
<b>Cloud Cover:</b>	80%				
<b>Wind:</b>	1				
<b>Tide:</b>	1.8 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
<b>Ki'ilae</b>					
<b>South Coves</b>				3	
<b>Admin/Picnic</b>					
<b>Royal Grounds</b>				1	
<b>Inner Ponds</b>					
<b>Total</b>	0	0	0	4	0

**Notes:**

2 Mongoose observed at Ki'ilae

<b>PUHO</b>					
<b>Date:</b>	11/3/03				
<b>Start Time:</b>	6:30 AM				
<b>End Time:</b>	7:35 AM				
<b>Temperature:</b>	22.2c				
<b>Cloud Cover:</b>	20%				
<b>Wind:</b>	2				
<b>Tide:</b>	0.6 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
<b>Ki'ilae</b>					
<b>South Coves</b>			1		
<b>Admin/Picnic</b>				4	
<b>Royal Grounds</b>		1		1	
<b>Inner Ponds</b>					
<b>Total</b>	0	1	1	5	0

**Notes:**

2 Grey Francolins observed in South Coves.

## Shorebird, Seabird, and Waterbird Inventories of Pu`uhonua O Hōnaunau National Historic Park

TABLE 2 (Continued)

PUHO					
Date:	11/17/03				
Start Time:	10:15 AM				
End Time:	12:15 PM				
Temperature:	28.4c				
Cloud Cover:	10%				
Wind:	1				
Tide:	1.8 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae			2		
South Coves				1	
Admin/Picnic		3	2	3	
Royal Grounds					
Inner Ponds				1	
Total	0	3	4	5	0
Notes: 2 people and 2 dogs off leash at Ki`ilae at time of survey. 2 people at South Coves at time of survey.					

PUHO					
Date:	12/1/03				
Start Time:	6:15 AM				
End Time:	7:15 AM				
Temperature:	23.7c				
Cloud Cover:	80%				
Wind:	1				
Tide:	1.0 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae					
South Coves				2	
Admin/Picnic				4	
Royal Grounds					
Inner Ponds			1	2	
Total	0	0	1	8	0
Notes: 1 cat observed at admin.					

PUHO					
Date:	12/15/03				
Start Time:	9:25 AM				
End Time:	10:30 AM				
Temperature:	26.2c				
Cloud Cover:	0%				
Wind:	1				
Tide:	1.8 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae			1		
South Coves					
Admin/Picnic			1	3	
Royal Grounds					
Inner Ponds			1		
Total	0	0	3	3	0
Notes: N/A					

PUHO					
Date:	1/5/04				
Start Time:	7:10 AM				
End Time:	8:15 AM				
Temperature:	21.2c				
Cloud Cover:	20%				
Wind:	1				
Tide:	1.1 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae					
South Coves			2	1	
Admin/Picnic		1		2	
Royal Grounds					
Inner Ponds			1		
Total	0	1	3	3	0
Notes: 1 cat observed at Ki`ilae.					

TABLE 2 (Continued)

<b>PUHO</b>					
<b>Date:</b>	<b>1/19/04</b>				
<b>Start Time:</b>	<b>8:55 AM</b>				
<b>End Time:</b>	<b>9:10 AM</b>				
<b>Temperature:</b>	<b>26.2c</b>				
<b>Cloud Cover:</b>	<b>5%</b>				
<b>Wind:</b>	<b>1</b>				
<b>Tide:</b>	<b>0.2 ft falling</b>				
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>			<b>2</b>		
<b>South Coves</b>			<b>3</b>	<b>1</b>	
<b>Admin/Picnic</b>		<b>1</b>		<b>3</b>	
<b>Royal Grounds</b>			<b>1</b>		
<b>Inner Ponds</b>			<b>1</b>	<b>1</b>	
<b>Total</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>5</b>	<b>0</b>
Notes: N/A					

<b>PUHO</b>					
<b>Date:</b>	<b>2/2/04</b>				
<b>Start Time:</b>	<b>6:40 AM</b>				
<b>End Time:</b>	<b>8:10 AM</b>				
<b>Temperature:</b>	<b>21.3</b>				
<b>Cloud Cover:</b>	<b>20%</b>				
<b>Wind:</b>	<b>1</b>				
<b>Tide:</b>	<b>0.8 ft falling</b>				
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>			<b>2</b>		
<b>South Coves</b>					
<b>Admin/Picnic</b>				<b>2</b>	
<b>Royal Grounds</b>			<b>1</b>		
<b>Inner Ponds</b>					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>0</b>
Notes: N/A					

<b>PUHO</b>					
<b>Date:</b>	<b>2/16/04</b>				
<b>Start Time:</b>	<b>9:10 AM</b>				
<b>End Time:</b>	<b>10:15 AM</b>				
<b>Temperature:</b>	<b>26.2c</b>				
<b>Cloud Cover:</b>	<b>10%</b>				
<b>Wind:</b>	<b>1</b>				
<b>Tide:</b>	<b>0.1 fr rising</b>				
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>			<b>2</b>		
<b>South Coves</b>			<b>2</b>		
<b>Admin/Picnic</b>					
<b>Royal Grounds</b>					
<b>Inner Ponds</b>					<b>1</b>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>1</b>
Notes: N/A					

<b>PUHO</b>					
<b>Date:</b>	<b>3-7-04*</b>				
<b>Start Time:</b>	<b>7:20 AM</b>				
<b>End Time:</b>	<b>8:35 AM</b>				
<b>Temperature:</b>	<b>23.7c</b>				
<b>Cloud Cover:</b>	<b>50%</b>				
<b>Wind:</b>	<b>0</b>				
<b>Tide:</b>	<b>1.0 ft falling</b>				
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>					
<b>South Coves</b>					
<b>Admin/Picnic</b>				<b>5</b>	
<b>Royal Grounds</b>					
<b>Inner Ponds</b>			<b>1</b>		
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>0</b>
Notes: * Make up survey due to park being closed on March 1st because of wind damage.					



TABLE 2 (Continued)

PUHO					
Date:	3/15/04				
Start Time:	8:55 AM				
End Time:	10:05 AM				
Temperature:	25.1c				
Cloud Cover:	10%				
Wind:	0				
Tide:	0.1 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae			1		
South Coves			1		
Admin/Picnic				2	
Royal Grounds				2	
Inner Ponds			1	1	2
Total	0	0	3	5	2
Notes: 1 BCNH nest observed, 1 adult 1 hatchling. Park staff reported seeing 2 hatchlings. photos/GPS taken.					

PUHO					
Date:	4/5/04				
Start Time:	6:10 AM				
End Time:	7:20 AM				
Temperature:	22.0c				
Cloud Cover:	30%				
Wind:	1				
Tide:	1.0 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae					
South Coves				1	
Admin/Picnic					
Royal Grounds					
Inner Ponds					1
Total	0	0	0	1	1
Notes: 1 BCNH juv. in nest. Photos taken. 1 Mongoose observed at Ki`ilae, admin., and inner ponds					

PUHO					
Date:	4/19/04				
Start Time:	8:35 AM				
End Time:	9:45 AM				
Temperature:	24.5c				
Cloud Cover:	20%				
Wind:	0				
Tide:	0.0 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae			4	3	
South Coves				1	
Admin/Picnic		2		2	
Royal Grounds					
Inner Ponds					1
Total	0	2	4	6	1
Notes: 1 juv. BCNH in nest tree.					

PUHO					
Date:	5/3/04				
Start Time:	6:15 AM				
End Time:	7:30 AM				
Temperature:	23.3c				
Cloud Cover:	50%				
Wind:	1				
Tide:	0.3 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Ki`ilae					
South Coves					
Admin/Picnic			1	1	
Royal Grounds					
Inner Ponds				1	1
Total	0	0	1	2	1
Notes: 1 juv. BCNH in nest tree.					

TABLE 2 (Continued)

<b>PUHO</b>					
<b>Date:</b>	5/17/04				
<b>Start Time:</b>	8:15 AM				
<b>End Time:</b>	9:35 AM				
<b>Temperature:</b>	26.3c				
<b>Cloud Cover:</b>	50%				
<b>Wind:</b>	1				
<b>Tide:</b>	0.0 ft rising				
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>					
<b>South Coves</b>					
<b>Admin/Picnic</b>				2	
<b>Royal Grounds</b>					
<b>Inner Ponds</b>					
<b>Total</b>	0	0	0	2	0
Notes: N/A					

<b>PUHO</b>					
<b>Totals</b>					
<b>17 Surveys</b>					
	<b>SAND</b>	<b>RUTU</b>	<b>PGPL</b>	<b>WATA</b>	<b>BCNH</b>
<b>Ki`ilae</b>	0	0	17	3	0
<b>South Coves</b>	0	0	9	10	0
<b>Admin/Picnic</b>	0	7	4	40	0
<b>Royal Grounds</b>	0	6	2	5	0
<b>Inner Ponds</b>	0	0	6	6	6
<b>Total</b>	0	13	38	64	6
<b>Avg. per survey</b>	0.00	0.76	2.24	3.76	0.35
<b>% of surveys</b>					
<b>Observed</b>	0.0%	35.3%	82.4%	94.1%	29.4%

TABLE 2 KEY

<b>PUHO</b>	<b>Site</b>	
<b>Date:</b>	month/day/year	
<b>Start Time:</b>		
<b>End Time:</b>		
<b>Temperature:</b>		
<b>Cloud Cover:</b>	Percentage of cloud cover	
<b>Wind:</b>	Beaufort Wind Scale:	
	0 under 1.6 kph	Calm
	1 1.7-4.8 kph	Light Air
	2 4.9-11.2 kph	Light Breeze
	3 11.3-19.2 kph	Gentle Breeze
<b>Tide:</b>	Height in feet	
<b>Species:</b>	<b>SAND</b>	Sanderling ( <i>Calidris alba</i> )
	<b>RUTU</b>	Ruddy Turnstone ( <i>Arenaria interpres</i> )
	<b>PGPL</b>	Pacific Golden-Plover ( <i>Pluvialis fulva</i> )
	<b>WATA</b>	Wandering Tattler ( <i>Heteroscelus incanus</i> )
	<b>BCNH</b>	Black-crowned Night-Heron ( <i>Nycticorax nycticorax hoactli</i> )